

REMARKS/ARGUMENTS

Favorable consideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 2-4, 9, and 11-32 are pending in the application, with Claims 1, 5-8, and 10 cancelled, Claims 20-32 added and Claims 2-4, 9, and 11-19 amended by the present amendment.

In the outstanding Office Action, Claim 10 was rejected under 35 U.S.C. § 112, second paragraph; Claims 1, 11, 14, and 16 were rejected under 35 U.S.C. § 102(b) as being anticipated by Japan Patent Publication 08-094,886 to Masayuki (hereinafter Masayuki); Claims 1-2, 4, 6, 8, 9, and 13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Catanzaro et al. (U.S. Patent No. 5,790,283, hereinafter Catanzaro); Claims 5, 9, 12-13, 15, and 17-19 were rejected under 35 U.S.C. § 103 as being unpatentable over Masayuki; and Claims 3 and 5 were rejected under 35 U.S.C. § 103 as being unpatentable over Catanzaro.

New independent Claims 20 and 21 correspond to original Claims 5 and 10, albeit written in independent form. Original Claim 2-4, 9, and 11-18 are amended to depend from new Claim 20. Claim 19 is amended to more clearly describe and distinctly claim Applicants' invention. New Claims 22-28, dependent from new Claim 21, recite the limitations of original Claims 2-5 and 17-19. New independent Claims 29-32 are directed to apparatuses corresponding to the methods recited in Claims 20-21. Support for these new claims is found in Applicants' original specification.¹ No new matter is added.

Briefly recapitulating new independent Claim 20 is directed to a method for adjusting an optical axis of a light transmission path that includes a plurality of optical components. The method includes sequentially adjusting an optical axis of a designated single optical component, or multiple optical components, among the plurality of optical components in

¹ Specification, Figure 5.

accordance with a probabilistic search technique. The method also includes measuring optical axial coordinate values while sequentially adjusting the optical axis to produce a plurality of measured optical axial coordinate values. The method also includes evaluating an intensity of light transmitted through the light transmission path at a time of measurement to produce a plurality of evaluation values. The method also includes storing in a memory a plurality of value pairs, each of the plurality of value pairs including a measured optical axial coordinate value and a corresponding evaluation value. The method also includes replacing a solution candidate of the probabilistic search technique with a value pair having a largest evaluation value.

New independent Claim 21 is also directed to a method for adjusting an optical axis of a light transmission path that includes a plurality of optical components. The method includes sequentially adjusting an optical axis of a designated single optical component, or multiple optical components, among the plurality of optical components in accordance with a probabilistic search technique. The method also includes evaluating a positional deviation of light transmitted through the light transmission path with respect to a target light irradiation position while sequentially adjusting the optical axis so as to create an evaluation value.

One patentably distinct difference between the inventions recited in Claims 20 and 21 is method of determining the evaluation value. In Claim 20 the evaluation value is determined as function of light intensity, while in Claim 21 the evaluation value is determined as a function of a positional deviation of light from a target light irradiation position. Each of the claimed methods allow for local peaks to be avoided and adjustments of optical axes having multiple degrees of freedom to be made at high speed and in parallel.

Each of the claimed methods also have a strong resistance to disturbances and do not require complex algorithms that take into account the distribution of transmitted light intensity.²

With regard to the rejection of Claim 10 under 35 U.S.C. § 112, second paragraph, with the finding that the term “positional deviation of light” is vague and indefinite. Claim 10 has been cancelled so the rejection is moot. However the term in question is recited in new Claim 20 along with other language that clarify the positional deviation of light transmitted through the light transmission path is evaluated with respect to a target light irradiation position. Applicants therefore submit Claim 20 is definite.

Masayuki teaches a method adjusting an optical axis without being affected by local peaks.³ However, contrary to the finding in the Official Action, Masayuki does not teach the use of a *probabilistic* search technique. The technique Masayuki actually uses is a *deterministic* search technique. That is to say, Masayuki approximates light intensity distribution as a Gaussian distribution and *determines* a next search point from the approximation results. There is no probabilistic behavior in the determined search point. When light intensity distributions to be adjusted are the same, the adjustment results become identical. Therefore, Masayuki does not teach “sequentially adjusting an optical axis ... in accordance with a probabilistic search technique” as recited in Applicants’ Claims 20 and 21.

Furthermore, Claims 20 and 21 recite “measuring optical axial coordinate values *while sequentially adjusting* said optical axis” and “evaluating a positional deviation of light ... *while sequentially adjusting* said optical axis,” respectively. That is to say, in the invention set forth in Claims 20 and 21, since probabilistic judgment (S22, S23 and S24 in Fig. 10) is included when determining a next search point, even when light intensity

² Specification, paragraph 0010.

³ Masayuki, page 1.

distributions are the same, adjustment results are different for every trial.⁴ Thus, it is possible allow the detector to be operated while axial values are being measured/evaluated so as to enable a more efficient search that avoids the local peaks of the light intensity distribution (e.g., as shown in Fig. 4). There is no teaching in Masayuki of “measuring optical axial coordinate values *while sequentially adjusting* said optical axis” or “evaluating a positional deviation of light ... *while sequentially adjusting* said optical axis” as recited in Claims 20 and 21, respectively. Therefore, Applicants submit the inventions defined by Claims 20 and 21, and all claims depending therefrom, are neither anticipated nor rendered obvious by Masayuki for at least the reasons stated above.⁵

Catanzaro teaches a method for adjusting an optical axis that includes a probabilistic search technique.⁶ However, like Masayuki, Catanzaro does not teach or suggest “measuring optical axial coordinate values *while sequentially adjusting* said optical axis” or “evaluating a positional deviation of light ... *while sequentially adjusting* said optical axis” as recited in Applicants’ independent Claims 20 and 21, respectively. Therefore, Applicants submit the inventions defined by Claims 20 and 21, and all claims depending therefrom, are neither anticipated nor rendered obvious by Catanzaro for at least the reasons stated above.⁷

Applicants also submit new independent Claims 29-32 patentably define over the cited references for at least the same reasons as those provided for Claims 20-21.

⁴ Specification, paragraphs 0071-0073.

⁵ MPEP § 2142 “...the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).”

⁶ Catanzaro, column 7, lines 53-55.

⁷ MPEP § 2142 “...the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).”

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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